

NON-PUBLIC?: N

ACCESSION #: 8903140524
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Salem Generating Station - Unit 2 PAGE: 1 OF 4

DOCKET NUMBER: 05000311

TITLE: Rx. Trip - #23 S/G SF/FF Mismatch With Low S/G Level Due To Inad.
Procedures

EVENT DATE: 02/05/89 LER #: 89-003-00 REPORT DATE: 03/02/89

OPERATING MODE: 1 POWER LEVEL: 060

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: M. J. Pollack - LER Coordinator TELEPHONE: (609) 339-4022

COMPONENT FAILURE DESCRIPTION:

CAUSE: B SYSTEM: SB COMPONENT: ZIS MANUFACTURER: N007
B SB RV C170

REPORTABLE TO NPRDS: N

N

SUPPLEMENTAL REPORT EXPECTED: NO EXPECTED SUBMISSION DATE:

ABSTRACT:

On 2/5/89, following power reduction from 90% to 60%, the Unit experienced a Rx. Trip on No. 23 Steam Generator (S/G) Low Level concurrent with Steam Flow/Feed Flow mismatch. At the time of the event, Nos. 23a and 23b Circulating Water Pumps and No. 23 Heater Drain Pump were out of service. Four minutes prior to the unit trip, No. 22 S/G Feed Pump (SGFP) had tripped due to low suction pressure. It was found that the low suction trip set point for the #22 SGFP responded high due to failure of the low suction pressure switch. The root cause of this event has been attributed to inadequate procedures associated with operating the plant with Circ. Water System reduced capacity concurrent with an inoperable Heater Drain Pump. Procedure AOP-COND-2 has been revised to clarify operator actions with inoperable Circ. Pumps and Heater Drain Pumps. The SGFP low suction pressure first out annunciator relay was installed and tested. The speed control and electric

overspeed were also checked for both SGFPs. The No. 22 SGFP low suction pressure switch was repaired and the No. 21 SGFP switch was checked and found satisfactory. The #21 SGFP mechanical overspeed device was checked and the pump was operated to simulate a transient prior to it being placed in service. The 23MS15 valve was adjusted and tested successfully. Investigation of the 23MS167 Control Room indication problem revealed that the "close" limit switch was not making proper contact. The switch was repaired and the valve tested satisfactorily. This event has been reviewed by Operations management and will be reviewed with applicable personnel. This event will be incorporated into applicable training programs.

END OF ABSTRACT

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PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as xx

IDENTIFICATION OF OCCURRENCE:

Reactor Trip - No. 23 S/G Steam Flow/Feed Flow Mismatch With Low Steam Generator Level Due To Inadequate Procedures

Event Date: 2/05/89

Report Date: 3/02/89

This report was initiated by Incident Report No. 89-083.

CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 Reactor Power 60% - Unit Load 700 MWe

DESCRIPTION OF OCCURRENCE:

On February 5, 1989 at 0307 hours, following power reduction from 90% to 60%, the Unit experienced a Reactor Trip on No. 23 Steam Generator (S/G) Low Level concurrent with Steam Flow/Feed Flow mismatch. At the time of the event, Nos. 23a and 23b Circulating Water Pumps and No. 23 Heater Drain Pump were out of service. Three minutes prior to the unit trip, No. 22 Steam Generator Feed Pump (SGFP) had tripped due to low suction pressure.

The Unit was stabilized in Mode 3 (Hot Standby) and at 0351 hours, the same day, the Nuclear Regulatory Commission was notified of the automatic actuation of the Reactor Protection System JC in accordance with Code of Federal Regulations 10CFR 50.72 (b) (2) (ii).

APPARENT CAUSE OF OCCURRENCE:

The root cause of this event has been attributed to inadequate procedures associated with operating the plant with Circulating Water System reduced capacity concurrent with an inoperable Heater Drain Pump.

Abnormal Operations Procedure AOP-COND-2, "Loss of Circulating Water and/or Condenser Vacuum" did not adequately address how to operate the unit when both circulators are out on the same condenser nor with the corresponding heater drain pump out of service. The procedure only recommended reducing power to avoid flashing. It did not give a specific power reduction. Subsequently, as described in the Analysis of Occurrence section, the SGFPs tripped as a result of flashing caused by not reducing power low enough with Nos. 23a and 23b Circulating Pumps and No. 23 Heater Drain Pump inoperable.

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ANALYSIS OF OCCURRENCE:

The Steam Flow/Feed Flow Mismatch coincident with Low S/G Level reactor trip is anticipatory. Its function is to prevent a loss of heat sink capability by sensing conditions which would eventually result in a dry steam generator. By tripping the reactor prior to reaching the Low-Low Level trip setpoint, the required starting time and capacity requirements for the Auxiliary Feedwater System BA are reduced; thereby, minimizing the thermal transient on the S/Gs and the Reactor Coolant System AB .

Investigation revealed that with the Circulating Pumps and the Heater Drain Pump out of service it was possible to flash in the 23 Condensate Pump suction line. The operator saw amps on 23 Condensate Pump drop and fluctuate at the time of the 21 and 22 SGFP low suction alarms. As flashing continued suction pressure continued to drop until No. 22 SGFP tripped. It was found that the low suction trip set point for the No. 22 SGFP responded high (conservatively) due to failure of the low suction pressure switch. Additionally, it was found that the relays for the "low feed pump suction pressure" first out annunciators were not installed. Therefore, during the transient it could not be determined why the SGFP tripped. Four minutes prior to the unit trip, the operator reduced power to approximately 60% from approximately 90%.

No 23b Circulating Pumps was removed from service at approximately 0220 hours. An Operator had been stationed at the vicinity of the Condensate Pumps. No. 23a Circulating Pump had been out of service for pump replacement previously. Hot Well levels were maintained at approximately 24". When No. 23b Circulating Pump was removed from service power was reduced to approximately 90% from 96%. They operated in this condition until No. 22 SGFP tripped at 0303 hours

Just prior to the reactor trip, engineering investigation, although not conclusive, determined that No. 21 SGFP had also tripped from low feed pump suction pressure. This has been substantiated by the drop in feed water flow by over 50% 2 seconds prior to the reactor trip. No. 21 SGFP tripped from low suction pressure because of the continuing suction problems with No. 23 Condensate Pump (i.e., flashing in the suction line). With both SGFPs tripped S/G level dropped to the trip setpoint coincident with the SF/FF mismatch.

It could not be determined why the "low feed pump suction pressure" first out annunciator relays were not installed.

During the post trip recovery, No. 23MS15 (Main Steam Safety Valve) lifted. The valve has a lift set point of 1070 psig. However, it appeared to open at 1030 psig. It could not be positively determined at what pressure it did lift due to incorrect installation of the lift assist apparatus. The cause of the lift has been attributed to set point drift.

The Reactor Protection System functioned as designed. However,

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ANALYSIS OF OCCURRENCE: (cont'd)

Control Room indication of closure of the 23MS167 valve (Main Steam Isolation Valve) was not immediately received. Post trip investigation revealed that it did close within the required time frame.

This occurrence did not affect the health or safety of the public. Due to the automatic actuation of the Reactor Protection System, this event is reportable in accordance with Code of Federal Regulations 10CFR 50.73 (a) (2) (iv).

CORRECTIVE ACTION:

Procedure AOP-COND-2 has been revised to clarify operator actions with

inoperable Circulating Pumps and Heater Drain Pumps. The procedure now details specific power reductions as well as maintaining a specific hotwell level, placing the hotwell sprays in service, requiring an operator to be kept in the area, and other requirements to ensure the secondary side operates properly in this condition.

The SGFP low suction pressure first out annunciator relay was installed and tested. The speed control and electric overspeed were also checked for both SGFPs. The No. 22 SGFP low suction pressure switch was repaired and the No. 21 SGFP switch was checked and found satisfactory.

The No. 21 SGFP mechanical overspeed device was checked and the pump was operated to simulate a transient prior to it being placed in service. Results were satisfactory.

The 23MS15 valve has been adjusted and tested successfully.

Investigation of the 23MS167 Control Room indication problem has revealed that the "close" limit switch was not making proper contact. The switch was repaired and the valve was tested satisfactorily.

The Unit was returned to operation on February 8, 1989.

This event has been reviewed by Operations management and will be reviewed with applicable Operations Department personnel.

This event will be reviewed by the Nuclear Training Center for incorporation into applicable training programs.

General Manager -
Salem Operations

MJP:pc
SORC Mtg. 89-016

ATTACHMENT 1 TO 8903140524 PAGE 1 OF 1

PSE&G
Public Service Electric and Gas Company
P.O. Box E Hancocks Bridge,
New Jersey 08038

Salem Generating Station

March 2, 1989

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Dear Sir:

SALEM GENERATING STATION
LICENSE NO. DPR-75
DOCKET NO. 50-311
UNIT NO. 2
LICENSEE EVENT REPORT 89-003-00

This Licensee Event Report is being submitted pursuant to the requirements of the Code of Federal Regulations 10CFR 50.73 (a) (2) (iv) .This report is being submitted within thirty (30) days of discovery.

Sincerely yours,

L. K. Miller
General Manager -
Salem Operations

MJP:pc Distribution

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